Joint Dark Energy Mission

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Dark Energy

- Cosmological Constant \((w = -1)\)
- Quintessence \((w \text{ not } -1)\)
- Modification to General Relativity
- ?

\[
\omega = \omega_0 + (1 - a) \omega_a
\]
Joint Dark Energy Mission

- Wide field 1.5 meter space telescope
- NASA/DOE will build JDEM (2008)
- 3 Dark Energy techniques
  - SuperNovae
  - Weak Lensing
  - Baryon Acoustic Oscillations
- multi-instrument design, eg. separate spectroscopic and imaging focal planes
Star Guider R&D

- Attitude Control System: System Demonstrator
  - achieved better than 40 milli-arcsec jitter
  - next: HyViSi sensor & SLAC data acquisition (EGSE) system
  - goal: 20 milli-arcsec jitter goal with flight-like system

Star Guider bench tests
- artificial star on 2D-stage
- HgCdTe/H2RG sensor
- SIDEVAR ASIC on SLAC cryo-board
- SLAC EGSE w/ star Centroid algorithm
- goal: demonstrate performance for undersampled images

moveable star
measured PSF for artificial star
HgCdTe/H2RG in dewar
SLAC EGSE
ACS Jitter (arcsec)
Ground and Flight Readout Electronics

- Stand-alone Sensor Readout System (EGSE)
  - supplied to UofMich, Purdue, Lyon, LBL
  - H2RG and LBL CCD readout
  - GUI and command-line interface
  - continued development to meet needs for sensor R&D
- Cryogenic SIDECAR
  - board to support cryo operation of SIDECAR
  - goal: study noise in 32-channel operation
- Focal-plane Readout
  - multi-channel Focal Plane Interface (FIU)
  - demonstrate prototype focal plane system
JDEM & Users

- several DOE Labs
  - LBNL - JDEM project office
  - SLAC
  - FNAL

- Instrumentation
  - Space Qualified Hardware
  - eg. Collaboration with Sensor R&D efforts
  - Natural connections with Electronics Development

- Science (and Data)
  - Gravitational Lensing (Weak and Strong)
  - Science AOs
  - eg. Collaboration with members of Science teams
  - SLAC capabilities (building on FERMI) for JDEM computing